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ABSTRACT

Seven years' experience in the utilization of instructional technology by the University of Wisconsin for the continuing education of health care personnel is reviewed. During the period 1965-1972 doctors and allied support professionals were given access to telephone conferences, a dial access library, films, tape/slide programs and television. A report of the impact of media oriented instruction upon professionals' knowledge and upon patient care is given, along with a description of future efforts to pay attention to the identification of educational needs, to the existing deficiencies in medical education, and to the establishment of patterns of lifetime learning. (PB)

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The Role of Technology in an Evolving Continuing Education Program for Health Professionals

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Abstract. Seven years' experience in utilization of instructional technology in continuing education programming at the University of Wisconsin is reported. Specific media and methodology used include telephone conferences, dial access library, single concept films, tape/slide programs and slow scan television, with attempts at evaluation of each described. The experience indicates that more attention must be given to identification of educational needs, deficiencies in medial school training programs, and evaluation of end results before optimum use of educational technology in continuing education is possible.

Key words: Medical education, continuing education, technology, evaluation, needs identification, testing, telelecture, dial access, Audio-visual.

In 1965 the Faculty of the University of Wisconsin Center for Health Sciences decided that the Center should assume a greater responsibility for the continuing education of health professionals. In determining the form this committment should take, a number of factors were considered. First, the professionals to be served are widely scattered geographically. Secondly, there is evidence to show that adults learn better through problem-oriented education. Third, there is also evidence that people acquire and retain information better if it is presented in smaller units with great frequency rather than massive doses on occasion. Fourth, there is a substantial volume of continuing education available to physicians and a lesser amount to allied health personnel: however, these traditional exercises appeared very time consuming for the potential benefit derived.

The conclusion was that if the University were to make a worthwhile contribution it would require innovation. There appeared to be promise in making current, pertinent and authoritative information available when, where, and in the form health professionals required it. This led to investigation of the potential of educational technology, and specifically in experimentation with:

1. Telephone Conferences.
2. Dial Access Tape Recording Library.
3. Single Concept Films.
4. Tape/Slide Programs.
5. Slow Scan Television.

These methods will be discussed along with significant problems the implementation of these programs uncovered, which have led to a redirection of research emphasis within the Department of Postgraduate Medical Education in recent years. Finally, the latter part of this paper will discuss at some length the problems inherent in the identification of educational needs, the continuum of education and the establishment of patterns of lifetime learning.

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Educational Technology

Technology has played an important role in the development of current programs. This emphasis is reflected in the educational services provided during the 1971–1972 academic year (Table 1). Of the 17837 instances where physicians used an educational service, 16912 or 94.81% of these involved media. For allied health personnel the figures are comparable: of the 13760 instances where services were used, 12935 of these or 94.00% involved media. Admittedly, some of the media services involved a five-minute tape recording while a "live" exercise may have been a three-day conference. However, in examining data which take this imbalance into account, there were 50255 individual hours of instruction presented, of which 22299 or 44.23% involved media.

Table 1. 1971–1972 postgraduate educational services university of Wisconsin

	Physician utilization	Allied healt utilization	Total utilization	Individual hours of instruction
Live teaching				
Conferences	874	675	1549	24552
Credit courses	3	0	3	2880
Consultant service	48	150	198	594
Sub-total	925	825	1750	28026
Media teaching				
Telephone conferences	265	1265	1530	16875
Dial access library	5668	646	6314	631
Single concepts films	10600	11000	21600	4320
Tape/slide programs	379	24	403	403
Sub-total	16912	12935	29847	22229
Total	17837	13760	31597	50255

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Telephone Conferences

When the department was formed seven years ago, the first effort was to initiate a program whereby lectures could be presented via telephone to practitioners in the state [7]. The goals were to offer instruction of the highest calibre, on a continuing basis, to focus on topics of direct application to clinical practice, at low cost, and without requiring the practitioner to leave his patient care responsibilities for any prolonged period.

When 10 or more practitioners enrolled in one community, a conference station was established at the local hospital or clinic. Station equipment included a loudspeaker connected to the incoming telephone line, a telephone handset for communication with all other stations on the network, and a 35 mm slide projector. The hospitals were connected by a network of private telephone lines leased on a full-time basis for teaching purposes. Programs originated from the University of Wisconsin campus.

A general format was devised, including approximately 30 minutes of illustrated lecture and 30 minutes of discussion. The lecture was tape recorded in advance and visuals were duplicated and a set mailed to each hospital prior to the conference for display during the recorded lecture, on command of the lecturer. When the formal portion of the program was completed, participants in the hospitals could come on the circuit and ask questions; each question and the lecturer's response would be heard at all hospitals.

There was ready acceptance of the medium. From the original 18 hospitals on the circuit in 1965, it has grown to 75 participating hospitals in 1972. Programming is presented weekly for physicians and monthly for a variety of allied health personnel.

The concept was not original with Wisconsin. It has been pioneered at Albany Medical College, Albany, New York [14], and similar programs had been conducted in Australia [9] and Britain [1].

Its newness to Wisconsin, however, did impose an obligation for evaluation, and a number of limited studies were carried out. Most significant of these, at least to the originators, involved measurement of retention and acquisition of knowledge in a course on electrocardiography. The same course, involving 16 hours of instruction, was presented to a group of 52 physicians over the telephone circuit, and concurrently to a class of 42 third-year medical students in a classroom setting. Pre-, post- and late post-tests were given; the results are presented in Fig. 1. Both groups demonstrated an acquisition of knowledge, with the medical students achieving slightly higher immediate post-test scores. Both showed retention of knowledge after a six-month interval; the medical students had an anticipated decay but the practitioners demonstrated additional improvement. While it is only conjecture, one possible reason is that those in practice put their new knowledge to use and continued to learn, while the medical students directed their study to

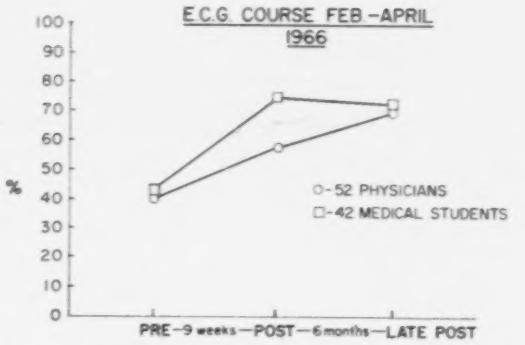

Fig. 1. Average performance of practitioners and medical students in electrocardiology, pre-test, post-test and 6 months post-test

other areas of medicine. The important conclusion, however, was that use of media did not interfere with the educational process.

Evaluation efforts were not always so successful. Upon acceptance of the telephone circuit as an effective teaching medium, one of the subsequent studies attempted to determine if additional independent study through assigned "home work" would increase the effectiveness of the conferences. An eight-hour course in hematology was designed and registrants divided into an experimental group which would receive outside reading assignments, extra slides to study, and self-assessment tests in addition to the conferences, and a control group which would only attend the conferences. This course was measured by pre-test and immediate post-test.

The control group showed a slight, but statistically insignificant increase in knowledge. The experimental group showed a slight, also statistically insignificant, decrease. In eight hours of instruction for one group, and a good deal more than that for the other, the course had accomplished nothing.

Faith in our faculty and medium led to a more detailed examination of the entire study. This analysis indicated that course content was at a level of sophistication appropriate to a specialist in internal medicine with a special interest in hematology, while the participants were general practitioners who did not have the knowledge base required to assimilate the course content. We succeeded in confusing them, rather than teaching them.

A succession of similar minor studies invariably uncovered human rather than technical shortcomings, and the conclusion is that the medium is as good or bad as the educational programming provided over it.

At this point in time, it is thought the telephone conferences are meeting the initial goals set for them. By offering a limited amount of information frequently, the circuit makes it possible to achieve truly continuing education. Subjective response from participants indicates that for the most part the programs are relevant

Fig. 2. Telephone Dial Access Library. Operator receiving call to Wisconsin Dial Access Library places appropriate cartridge in the playback unit, presses a button to connect the unit with the telephone line, and is then ready for the next call while the tape plays to its conclusion. Five callers may be served simultaneously from the library

to clinical practice. The average cost of $ 2.68 per individual hour of instruction in 1971–1972 appears reasonable. The fact that the programs are offered for physicians in the early morning hours, and each participant can be making his hospital rounds within a few minutes of the end of a program, means that he is not removed from his practice for any substantial period of time. The department thinks its calibre of programming is high, but there has been no substantiation of this goal.

There is dissatisfaction with the curriculum development process, relating to both relevance and quality of instruction; selection of subjects is based more on intuition and individual judgements than on any objective data related to identified needs. Efforts to explore this will be discussed later in this paper.

Dial Access Library

In April of 1966 the department began a feasibility study of a second use of media in continuing education [8]. There appeared to be need for an immediate source of information which was not being met by traditional reference sources. Either standard references were not immediately available, or the physician had reason to believe that the information they contained was out-dated.

To meet this apparent need, a number of short (4–6 min) tape recordings were made on the diagnosis and treatment of specific diseases and conditions. These were placed in self-rewinding cartridges that could be played on tape repeaters connected to telephone lines, Fig. 2. In this way, a physician who felt unsecure about handling a particular patient problem could call the service at any time of the day or night and listen to the appropriate tape recording. On the basis of utilization figures during this feasibility study, funds were obtained to expand the service. At present the library contains over 500 tape recordings. It is available to physicians in Wisconsin on a subscription basis and through a contractual arrangement with the federal government to all physicians in Veterans Administration hospitals and Public Health Service clinics and hospitals throughout the United States.

The service has been evaluated by means of a record of all calls received, and a post-card survey of users. While the initial intent was to provide a service for family physicians, it has proved to be of almost equal use to specialists and those in training (Table 2). While designed to meet specific patient problems, it is being used as a general educational resource with equal frequency (Table 3). Perhaps most important, 19.7% of the users surveyed (from among those calling with specific patient problems) indicated they changed

Table 2. Dial access library distribution of calls by type of practice (22 months)

Type of caller	Percent of total calls
General practitioners	34.5
Specialists	28.1
In training	28.4
Others	9.0

Table 3. Dial access library primary reason for call (nine months)

Reason	Percent of total calls
Specific patient problem	44.8
General reason	47.6
Both	7.6

their management of the patient as a result of information obtained from the tape recording. Another 12.8% of the total users surveyed (from among those who called for general educational purposes) indicated they would change certain aspects of their patient care as a result. Thus nearly one-third of the calls resulted in a reported change in behavior by the physician.

The dial access library has been of some assistance in identifying possible common educational needs. By maintaining utilization records for each specific tape, and total usage for tapes in a general area of medicine, it is possible to make judgements in curriculum planning. For example, Wisconsin physicians have most frequently called for tapes on marriage counselling, the Rh-negative pregnant patient, cardiac arrhythmias, and drug abuse by teenagers. Veterans Administration physicians have most frequently called for tapes on drug abuse and alcoholism.

The concept of the dial access library has been adopted by others since its inception. At present there are 13 such services in the United States and Canada, serving 20 states and provinces. Evaluation to date has replicated the Wisconsin strategy; consequently judgements as to the value of such services are based on similar subjective data. There is no objective evidence as yet that use of the dial access library results in improved patient care.

Single Concept Films

Early in program development, the department also detected an apparent need for a medium which would show motion in the teaching process; there are a certain number of comparatively simple techniques and procedures which have been recently introduced and cannot easily be mastered by reading about them or observing photographic slides or printed visuals. Traditionally in medical education these topics have been the subject of 16 mm films of 30–60 min duration. While film was considered an effective medium, it was thought that in deference to the physician's time constraints it would be more helpful if such films could be limited to a single concept and restricted to essential information in performance of the procedure or technique. Also, to avoid the problems of acquiring a projector and screen, threading the film, and darkening the room for viewing, it was decided to use an automatic projector with self-rewinding 8 mm film cartridges.

Such an educational program was initiated [13]. Five films were produced and a sixth adapted from a locally produced film. These were made available in the community hospital and acceptance was enthusiastic. As a result, the program was expanded. Adaptation of the one film proved significantly less expensive, so new content was obtained by reviewing longer films produced by other sources, determining if there was a 10–15 min segment which gave the essential information and, if so, requesting permission to exerpt that portion. In this way an additional 50 films were produced.

The program proved highly popular. Initially a hospital ordered a series of six films and was sent a projector and one film a week for six weeks. When the backlog of orders resulted in nearly a year's delay it was necessary to order more projectors and reduce the time for viewing one series to three weeks.

Evaluation of this program has been somewhat limited. A counter was placed in each projector, so a record could be maintained on utilization (Table 4). This was further refined in level of utilization by size of hospital (Table 5). Questionnaires were placed next to the projectors; responses were obtained from less than 50% of the viewers. The questionnaire indicated that 93% of those responding found the information contained in the films of value in their practices.

Table 4. Single concept films times machine turned on (40 hospitals)

Total	5472
Total per hospital (av.)	137
Weekly total per hospital (av.)	23

Table 5. Single concept films

No. of medical staff	Average times machine turned on/6 weeks
0–10	93
11–30	139
31–60	121
61–150	189
151–295	232

The program is now operating at a reduced level; all hospitals in Wisconsin that have interest in the films have had them and high cost has restricted new production. The experience, however, gives the department confidence that it will find the new video cassette units of value in its educational program, and

anticipates these will be less expensive in development of program content. There is also thought of concentrating on topics which have repeated use as part of a hospital inservice training program, rather than those which hospitals accept only for one-time viewing. This repeated utilization as a part of a continuing inservice program would also offer greater potential for evaluation in terms of behavior change and improved patient care.

Tape/Slide Programs

Production of tape recordings for the telephone conference programs, along with 75 sets of accompanying visuals, soon began to create a storage problem. To relieve this, the department began to make the lecture tapes available by sale to hospitals and individuals for independent study. While the motives have little educational merit, the program apparently does. Sales have been substantial, and when the units were placed in the medical library for use by those in training, utilization levels were high. Arrangements are now being made to have selected program units available through a nationally established publishing firm.

In spite of the fact that the effectiveness of audio tape as an educational medium has been accepted since its use by the U.S. armed forces in World War II [12], a study was carried out with medical students to reconfirm this. A series of lectures which were traditionally presented with great frequency to small groups of students was selected, tape recordings made, and visuals produced. The third-year medical school class was divided into three groups: One received its information by live lecture, the second by tape/slide units in study carrels, and the third by tape/slide units in home study kits. Pre- and immediate post-testing were used. There was no significant difference in the acquisition of knowledge among the three groups. Late post-testing was attempted but loss of both contact and control over the students resulted in insufficient data on which to base conclusions regarding retention of knowledge.

The department has been notably unsuccessful in automating its presentation of tape/slide program units, to the point that the current basic equipment used is a cassette player and a hand operated slide viewer. Experience with synchronized units has been disappointing, due to lack of dependability and high repair levels. With the low cost of the unsophisticated equipment, and apparent acceptance at least by students, the department feels comfortable with the present system. However, experimentation continues in the development of an automated system which will give the user a minimum of inconvenience and maximum of control over the program unit.

Slow Scan Television

All of the media used by the department at this time require advance production of educational content. It appeared to the staff that there would be merit in making some of the more than 50 educational events occurring weekly in the medical center available on a broader geographic basis. Presenting the audio portion would be simple, utilizing telephone lines. Real time transmission of video, however, presented problems since there is no statewide educational television network available in Wisconsin and the prospects of financing such a system did not appear realistic.

For this reason, the department began an experiment with slow scan television, a method of transmitting still visuals over regular telephone lines and displaying them on television monitors at remote sites. While the investment in equipment would be essentially the same as with regular television, the continuing costs of technical staff and transmission lines would be greatly reduced.

A prototype system was constructed by a national electronics firm and installed in four community hospitals. Due to technical problems which arose in establishing and maintaining the system, little valid educational use or evaluation were possible. While the equipment has been modified for an experiment in satellite communication, the possibility of its use in general continuing medical education is not being pursued at this time.

Value of Media

It is the concensus of the staff of the Department of Postgraduate Medical Education that the use of instructional media has enabled it to present a variety of continuing education to substantial numbers of health professionals in Wisconsin. In the process, it has carried out limited evaluation which leads to the conclusion that the use of media does not detract from the teaching-learning process. The evaluation has not confirmed that the educational programming presented via media has in any way improved the care delivered to the patient, which the staff thinks is the ultimate measurement of any continuing education program. However, for the immediate future, and until the techniques are available to measure quality of patient care, there appears to be sufficient supporting information to warrant continuation of present programming and innovation in methods and media.

New Problem Areas

From an introspective point of view, perhaps the major contribution of instructional technology is that it has forced the department of evaluate. There is little demand that traditional educational methods be assessed; people assume that the library and lecture-discussion method of instruction are effective. However, if the content of the library is made available through an automated information retrieval system, or the lecture-discussion events are presented over telephone, both the faculty and administration want data on the effectiveness of these "new" methods and media.

This responsibility soon developed into an enthusiastic, if at times inept, committment to evaluation. As a result, the department is now deeply involved in some substantive areas of education which have great significance to the effective use of instructional technology.

The problems raised by experience to date seem to fall into three major categories.

1. Identification of educational needs.
2. Effect of continuing education on quality of care.
3. The continuum of education.

Identification of Needs

Early in the development of postgraduate courses for physicians, considerable experimention was carried out in curriculum design. Some of the more traditional methods did not seem to render the desired results. The first method used was to consult with leading faculty at the medical school to determine what they thought was important for the practitioner to learn. As teachers and researchers, the faculty must remain current, through reading and other activities, in their knowledge of new developments in their specialized fields. As consultants, they gain insight into the limitations and requirements of primary care physicians. Through telephone inquiries and informal discussions with clinicians, they develop a grasp of what problems are bothering those in practice. Consequently it was thought the faculty would be a valuable resource for curriculum development.

As programs were presented, and rapport established with practicing physicians, the department began to seek their opinions as to what should be taught. The obvious thesis is that the practicing physician is well qualified to identify those areas in which he needs educational assistance.

Finally, as physicians on the departmental staff gained experience in continuing education, they developed a degree of confidence in their ability to design curricula which would be relevant to clinical practice.

These three sources were utilized almost exclusively, in varying sequence, to develop program content for the technical systems as they were established. Retrospective studies, based on attendance figures and participants' comments, indicated that no method was measurably superior; they were equally good—or bad.

The suspicion that it was the latter was strengthened by experience. As a group of practicing physicians would sit around a table with departmental staff to develop a curriculum for a specific series of teaching programs, more often than not they would suggest varied and even conflicting lists of potential topics. These were practitioners selected because they were leaders in their communities and professional societies, and supposedly could present informed viewpoints representative of their peers. Even when these opinion leaders could agree on common topics, subsequent feedback to actual programming brought varied comments as to the relevance of the curriculum to the practice of medicine.

This led to both frustration, and the thought that perhaps there are fewer common eductional needs than one would expect. Perhaps individual medical practices differ to such an extent that educational needs also vary greatly from one individual to the next, regardless of the specialty label affixed to their common area of medical practice.

Individual Physician Profile

To test this thesis, a research project was designed to survey a physician's practice, test him on those diseases and conditions he treated most frequently, consult with him on educational needs indicated by the process, and then help him design an individualized continuing education program.

The research was conducted under contracts NIH 70–4008 and NIH 70–4030 with the Bureau of Health Manpower Education, National Institutes of Health, between July 1, 1968 and June 30, 1971. The first 18 months were spent in development of procedures and resources required, and experimentation with the cooperation of 37 physicians. The second 18 months involved changes and improvements of procedures and resources from the first study period, development of new resources, and experimentation with the cooperation of 76 physicians. By the end of the three years, the department was satisfied that it had a reasonable procedure for helping individual family practitioners identify their unique educational needs. Limited experience suggested it did not work as well for specialists, probably because the testing means has not been sufficiently refined.

To collect data on his practice, the physician is asked to dictate into a portable tape recorder certain information on each patient contact. This includes age and sex of patient, method or place of contact (office, hospital, telephone, or home visit), significant presenting signs or symptoms, major tentative diagnosis, contributing diagnoses, tests ordered, and treatment or disposition. These data are collected one day a week for four weeks, to obtain a representative sample of the physician's practice. The tape cassettes are transcribed and the diagnoses coded in the International Classification of Diseases, Adapted (ICDA) to develop his practice profile.

A computerized test bank, containing approximately 2000 questions, also coded in the ICDA, has been developed. The practice profile is entered into the computer and an individualized test composed, based on the profile. The intent is that the test reflect the volumes and distribution of patient problems according to the ICDA listing. The test is given and the results furnished to both the participating physician and a faculty consultant.

On the basis of the practice profile, test results, and other information gained in discussion with the

physician, the two then jointly arrive at a program of continuing education. This program is entered into the computer where a listing of educational resources is stored, also coded in the ICDA. The computer prints out a listing of educational events and materials matched to the areas selected for study. From this list the participating physician selects those conferences, audio-visual materials, etc. which appear to be most appropriate.

Of the 76 physicians who participated in the second study phase, 63 were family practitioners, seven pediatricians, five internists, and one a surgeon. The conclusion at the end of the study was that the procedure did help the family practitioners identify their unique educational needs. The procedure is now being made available to all family practitioners in Wisconsin under a program sponsored by the W. K. Kellogg Foundation, Battle Creek, Michigan, in cooperation with the Wisconsin Academy of Family Physicians. It is hoped that 400 family physicians will be enrolled in the program by 1975. Research is continuing on improving the procedure and resources to the point that they are equally successful for medical specialists.

Technology played an important role in the research. In most cases it was a successful application; in some it was not. The use of the computer in storing, analyzing and retrieving physician and patient data was invaluable. The storage and retrieval of individual test questions and appropriate educational resources was also critical to the program. One feature which was unsuccessful was an attempt during the first study phase to conduct an on-line, interactive test. A portable teletype was delivered to the physician's office and, by means of telephone line, access was gained to the computer, often more than 100 miles away. The physician's profile would be entered and within seconds the test would have been composed and the first question printed out on the teletype in the physician's office. He would read the question, select an option, and give his response. The computer would indicate whether it was right or wrong, and if wrong would immediately give him the correct answer. It would then print the second question. Due to significant technical problems, high cost, and the distracting noise of the portable teletype, this method was abandoned in the second study phase and a written test substituted.

Broader Implications

The department is encouraged by the results related to identifying and meeting individual educational needs; it is also enthusiastic about the possibilities for use of cumulative data obtained in the project. For the first time there are reasonable data available concerning family practice in Wisconsin, which can be used both in continuing education and to make decisions earlier in the continuum of medical education. The data collected, when sufficiently substantial to warrant it, will be compared with the medical school curriculum and it is anticipated that judgements will be possible on whether or not the current educational program prepares the physician to meet the patient problems he will encounter in practice.

Peer Review

Another promising technique of detecting educational needs involves a peer review process, based on hospitalized patients, developed by Clement Brown, M. D., at Chestnut Hill Hospital, Philadelphia, Pennsylvania [3]; Robert L. Evans, M. D., at York Hospital, York, Pennsylvania; and Beverly Payne, M. D., for the Michigan State Medical Society and Hawaii Medical Association.

The procedures used require a hospital staff to set criteria for optimum treatment of specific diseases and conditions, examine patient records to determine how well these criteria are met in practice, and take corrective action to close the gap between actual and optimum care. The needs identified, at times, require an educational solution; at times they call for other action. Efforts are now being made by researchers in the United States to apply these procedures to ambulatory care.

Self-Assessment Tests

A number of national medical organizations in the United States have also provided their members an opportunity to assess their medical knowledge by administering voluntary nationwide self-assessment tests [4, 11]. Members who participate receive extensive testing throughout their areas of specialization, often administered over a series of weekends. The results are either furnished immediately or after centralized scoring, so that each may detect his areas of weakness.

Team Surveys

Another approach to identifying educational as well as other needs has evolved at the University of Wisconsin, with the Department of Postgraduate Medical Education playing only a minor role in the initial organization. This involves a perinatal care team consisting of a pediatrician, a nurse, and an engineer visiting a hospital. The two health professionals examine the procedures involved in the care for newborns and the engineer examines the equipment used, to determine that appropriate equipment is available and that it is functioning properly. After the visit, during which much teaching is done, the team provides a written report with its recommendations for improving care of the newborn.

Quality of Care Assessment

Another major problem encountered involves evaluation of the end result of continuing education, its effect on the quality of care. As previously indicated, Brown [3] has shown that for the 20% of

medical practice that is hospital based, there is measurable improvement when deficiencies are documented and educational programs are instituted wherever they may be appropriate. For the approximately 80% of practice that is outside the hospital, virtually no similar investigation has been carried out. The individual physician profile process does not deal with quality of care, except by inference.

Until such mechanisms are developed and validated, it will be difficult to evaluate continuing education, whether instructional technology is involved or not, in terms of the end result.

Continuum of Education

In exploring some of its shortcomings in continuing education, the department found itself considering the total educational process to which health professionals are exposed, and viewing it in the context of recent educational philosophy. This led to the questioning of some basic dogmas upon which medical education in the United States is built.

The student, through his minimum of eight years in higher education, is required to make significant adjustments in his learning patterns. As an undergraduate, he is directed through a structured course of study centered on certain prerequisites he must complete for entry into medical school. During his first two years of medical education he encounters a similar structure for mastery of the basic sciences, based on reading, lectures, and laboratory experiences. For the next two years he acquires clinical knowledge and skills by substituting a tutorial relationship with the faculty for his laboratory exercises, and continues with his reading and lectures. Upon receipt of the medical degree, and entry into internship and residency training, the tutorial relationship becomes dominant and the importance of lectures decreases, while reading continues as a primary study method. He has access to a multitude of conferences, many dealing with abstruse but interesting cases, and may well fail to acquire a realistic view of the everyday practice of medicine.

Finally, upon entry into private practice, the new physician not only has to face the challenges this presents, but also finds himself separated from the educational system upon which he has relied for so many years. No longer is someone else responsible for determining his educational needs and developing the necessary curriculum. He is also separated from the educational methods on which he has most recently relied.

If this rationale is valid, it is small wonder that the practicing physician leans heavily on the learning methods which are most readily available, reading and discussion with colleagues. Many supplement these with other familiar methodologies such as lectures, when they are available. With this background, it is logical that the introduction of technology into the continuing education field is a slow and often disappointing process.

Equally, in his formative years in training for medicine, the student is given little opportunity to define his own personal objectives and, perhaps more important, to learn the manner in which he can most comfortably and efficiently acquire the concepts and skills necessary for the practice of quality medicine throughout his professional lifetime. He has little opportunity to assess his own progress, yet eventually he will have to take full responsibility for this through the subsequent forty years of his learning life.

The assumption is therefore made that if the medical school and graduate experiences can be structured so that the student takes an increasing role in his own objective setting, learning methodology, and progress assessment throughout his training period, he will be better able to manage the transition into delivery of optimal care, using his own unique learning styles and capabilities to maintain and increase his competence throughout his professional lifetime.

On the basis of these assumptions, those responsible for continuing education at the University of Wisconsin now find themselves involved in the medical school teaching program. The intent is not that the structured portion of medical education must be changed to accommodate continuing education, but that the entire continuum of medical education will be improved by the changes suggested.

Summary and Conclusions

The department has confidence that instructional technology is making a valuable contribution to continuing education of health professionals in Wisconsin. It is satisfied that educational services are being provided for substantial numbers of health care personal that would not be possible without the emphasis on media. There is also some objective evidence, outside of the obvious virtues, that the variety and volume of programming eventually benefits the patients.

However, there is a growing conviction that the full potential of the instructional technology is not being realized. Before this can be accomplished there must be rational methods of needs assessment and perhaps some basic changes in the continuum of medical education.

Finally, if the ultimate goal of continuing education is optimum quality of health care for the patient, some means must be developed to assess this quality so that the faculty, program planners and practicing physicians have objective data available to them as the basis for making educational decisions.

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